Official Amendment
Serial No. – 10/625,885
Docket No. – UVD 0279 IA / UD 267

Amendments to the Claims

The following listing of claims will replace all prior versions, and listings, of claims in the present application:

Please amend claims 1, 46, 77, and 102-104 as follows:

1. (Currently Amended) A corrosion-inhibiting pigment composition comprising:

a corrosion-inhibiting pigment comprising a rare earth element and a valence stabilizer combined to form a rare earth/valence stabilizer complex, wherein the rare earth element is selected from cerium, praseodymium, terbium, or a combination thereof, and at least one rare earth element is in the tetravalent oxidation state, and wherein the rare earth/valence stabilizer complex has a solubility in water of between about 1×10^{0} and about 1×10^{-5} moles per liter of cerium, terbium, or praseodymium at about 25°C and about 760 Torr; and

a coating system selected from a carrier system, a binder system, or a resin system.

2. (Canceled)

3. (Original) The pigment of claim 2 wherein the solubility of the rare earth/valence stabilizer complex in water is between about 1×10^{-1} and about 1×10^{-4} moles per liter of cerium, terbium, or praseodymium at about 25°C and about 760 Torr.

4. (Original) The pigment of claim 1 wherein there is an electrostatic barrier layer around the rare earth/valence stabilizer complex in aqueous solution.

5. (Original) The pigment of claim 1 wherein the rare earth/valence stabilizer complex acts as an ion exchange agent towards corrosive ions.

6. (Original) The pigment of claim 1 wherein the rare earth/valence stabilizer complex decomposes above about 100°C.

7. (Original) The pigment of claim 1 wherein the rare earth/valence stabilizer complex melts above about 50°C.

8. (Original) The pigment of claim 1 wherein the rare earth/valence stabilizer complex has a central cavity containing a cerium, praseodymium or terbium ion and an additional ion.

9. (Original) The pigment of claim 8 wherein the additional ion is B^{+3}, Al^{+3}, Si^{+4}, P^{+5}, Ti^{+4}, V^{+5}, V^{+4}, Cr^{+6}, Cr^{+3}, Mn^{+2}, Mn^{+3}, Mn^{+4}, Fe^{+3}, Fe^{+2}, Co^{+2}, Co^{+3}, Ni^{+2}, Ni^{+3}, Ni^{+4}, Cu^{+2}, Cu^{+3}, Zn^{+2}, Ga^{+3}, Ge^{+4}, As^{+5}, As^{+3}, or Zr^{+4}.

10. (Original) The pigment of claim 1 wherein the valence stabilizer is an inorganic valence stabilizer or an organic valence stabilizer.

11. (Original) The pigment of claim 10 wherein the valence stabilizer is the inorganic valence stabilizer selected from molybdates, tungstates, vanadates, niobates, tantalates, tellurates, periodates, iodates, antimonates, stannates, sulfates, phosphates, bromates, carbonates, nitrates, titanates, zirconates, bismuthates, germanates, arsenates, selenates, borates, aluminates, silicates, or combinations thereof.

12. (Original) The pigment of claim 11 wherein the valence stabilizer is the inorganic valence stabilizer selected from molybdates, tungstates, vanadates, niobates, tantalates, tellurates,

periodates, iodates, antimonates, stannates, sulfates, phosphates, bromates, carbonates, nitrates, or combinations thereof.

13. (Original) The pigment of claim 10 wherein the valence stabilizer is the organic valence stabilizer selected from monoamines; diamines; triamines; tetraamines; pentamines; hexamines; five- or six-membered heterocyclic rings containing one to four nitrogen atoms optionally having additional nitrogen, sulfur, or oxygen binding sites; five- or six-membered heterocyclic rings containing one or two sulfur atoms and having additional nitrogen binding sites; five- or six-membered heterocyclic rings containing one or two oxygen atoms and having additional nitrogen binding sites; (two-, three-, four-, six-, eight-, or ten-)membered nitrogen, nitrogen-sulfur, or nitrogen-oxygen macrocyclics; macrocyclic oligothioketones or dithiolenes; diazenes; thio-, amido-, or imido- derivatives of hypophosphoric, phosphoric, or diphosphoric acids and salts; thio-derivatives of hypophosphoric, phosphoric, or diphosphoric acids and salts; azo compounds, triazenes, formazans, azines, hydrazones, or Schiff Bases containing at least two azo, imine, or azine groups; azo compounds, triazenes, formazans, azines, hydrazones, or Schiff Bases; ortho- (for aryl) or alpha- or beta- (for alkyl) substituted azo compounds, triazenes, formazans, azines, hydrazones, or Schiff Bases; oximes; amidines and imido compounds; dithio ligands; amides; amino acids; N-(thio)acyl 7-aminobenzylidenimines; (thio)hydroxamates; alpha- or ortho-aminothio(di)carboxylic acids and salts; (thio)semicarbazones; (thio)acyl hydrazones; (thio)carbazones; silylaminoalcohols; thioalkyl amines and imines; hydroxyalkyl imines; (thio)aryl amines and imines; guanylureas; guanidinoureas; 2-nitrosophenols; 2-nitrophenols; N-nitrosohydroxylamines; 1,3-monothioketones; monothiomalonamides; 2-thioacylacetamides; 2-acylthioacetamides; dithiodicarbonic diamides; tritbiodicarboxylic acids and salts; monothiocarbamates; monothioethers; dithioethers; trithioethers; tetrathioethers; pentathioethers; hexathioethers; disulfides; monophosphines; diphosphines; triphosphines; tetraphosphines; pentaphosphines; hexaphosphines; five- or six-membered heterocyclic rings containing one or two sulfur atoms optionally having additional sulfur, oxygen, or phosphorus binding sites; five-

or six-membered heterocyclic rings containing one to three phosphorus atoms optionally having additional phosphorus, nitrogen, oxygen, or sulfur binding sites; five- or six-membered heterocyclic rings containing one to four nitrogen atoms and having additional phosphorus binding sites; five- or six-membered heterocyclic rings containing one or two oxygen atoms and optionally having additional sulfur or phosphorus binding sites; (five-, seven-, or nine-)membered nitrogen, nitrogen-sulfur, or nitrogen-oxygen macrocyclics; (two- to ten-)membered sulfur, sulfur-oxygen, or sulfur-phosphorus macrocyclics, not including oligothioketones or dithiolenes; (two- to ten-)membered phosphorus, nitrogen-phosphorus, or oxygen-phosphorus macrocyclics; (two- to ten-)membered oxygen macrocyclics; thio-, amido-, or imido- derivatives of phosphonic and diphosphonic acids and salts containing no sulfur binding sites; amido-, or imido- derivatives of hypophosphoric, phosphoric, or diphosphoric acids and salts containing no sulfur binding sites; dithioperoxydiphosphoramides; dithioperoxydiphosphoric acids and salts; monothioperoxydiphosphoramides; monothioperoxydiphosphoric acids and salts; monothiophosphoric acids; phosphoro(dithioperoxoic) acids and salts; azo compounds, triazenes, formazans, azines, or Schiff Bases; silylamines; silazanes; guanidines and diguanidines; pyridinaldimines; hydrazones; hydramides; nitriles; thioureas and thioamides; ureas and pseudoureas; biurets; monothio ligands; diketone ligands; dithioperoxydicarbonic acids and salts; dithioacyl disulfides; tetrathioperoxydicarbonic diamides; (hexa-, penta-, or tetra-)thioperoxydicarbonic acids and salts; 1,2-dithiolates; rhodanines; dithiocarbimates; (thio)xanthates; S-(alkyl- or aryl-thio)thiocarboxylic acids and salts; phosphinodithioformates; (thio)borates and (thio)boronates; (thio)arsonic acids and salts; (thio)antimonic acids and salts; phosphine and arsine sulfides or oxides; beta-hydroxyketones and –aldehydes; squaric acids and salts; carbonates; carbamates and carbimates; carbazates; imidosulfurous diamides; sulfurdiimines; thiocarbonyl and mercapto oximes; 2-nitrothiophenols; 2-nitrilo(thio)phenols; acylcyanamides; imidates; 2-amidinoacetates; beta-ketoamines; 3-aminoacrylamides and 3,3-diaminoacrylamides; 3-aminoacrylic acids and salts and 3-hydroxy-3-aminoacrylic acids and salts; 2-nitroanilines; amine and diazine N-oxides; hydrazides and semicarbazides; (amino- or

imino-)aryl phosphines; (thio- or hydroxy-)aryl phosphines; arsines; five- or six-membered heterocyclic rings containing one arsenic atom optionally having additional arsenic binding sites;(two- to six-)membered arsenic macrocyclics; selenoethers; five- or six-membered heterocyclic rings containing one or two selenium atoms optionally having additional selenium binding sites; (two- to six-)membered selenium macrocyclics; 1,3-diselenoketones; 1,1-diselenolates; diselenocarbamates; selenophosphoric acids and salts; selenocarbonates; cyanide, isocyanide, and cyanamide ligands; nitrosyl and nitrite ligands; azide ligands; thiolates and selenolates; (thio)cyanate ligands; diene or bicyclic or tricyclic hydrocarbon ligands; carbonyl, halogen, oxo, and hydroxo ligands; or combinations thereof.

14. (Original) The pigment of claim 13 wherein the organic valence stabilizer is selected from monoamines; diamines; triamines; tetraamines; pentamines; hexamines; five- or six-membered heterocyclic rings containing one to four nitrogen atoms optionally having additional nitrogen, sulfur, or oxygen binding sites; five- or six-membered heterocyclic rings containing one or two sulfur atoms and having additional nitrogen binding sites; five- or six-membered heterocyclic rings containing one or two oxygen atoms and having additional nitrogen binding sites; (two-, three-, four-, six-, eight-, or ten-)membered nitrogen, nitrogen-sulfur, or nitrogen-oxygen macrocyclics; macrocyclic oligothioketones or dithiolenes; diazenes; thio-, amido-, or imido- derivatives of hypophosphoric, phosphoric, or diphosphoric acids and salts; azo compounds, triazenes, formazans, azines, hydrazones, or Schiff Bases containing at least two azo, imine, or azine groups; azo compounds, triazenes, formazans, azines, hydrazones, or Schiff Bases; ortho- (for aryl) or alpha- or beta- (for alkyl) substituted azo compounds, triazenes, formazans, azines, hydrazones, or Schiff Bases; oximes; amidines and imido compounds; dithio ligands; amides; amino acids; N-(thio)acyl 7-aminobenzylidenimines; (thio)hydroxamates; alpha- or ortho-aminothio(di)carboxylic acids and salts; (thio)semicarbazones; (thio)acyl hydrazones; (thio)carbazones; silylaminoalcohols; thioalkyl amines and imines; hydroxyalkyl imines; (thio)aryl amines and imines; guanylureas; guanidinoureas; biurets; diketone ligands;

amido- or imido-derivatives of hypophosphoric, phosphoric, or diphosphoric acids and salts; beta-hydroxyketones and –aldehydes; squaric acids and salts; carbonates; carbamates and carbimates; 2-nitrosophenols; 2-nitrophenols; N-nitrosohydroxylamines; 1,3-monothioketones; monothiomalonamides; 2-thioacylacetamides; 2-acylthioacetamides; dithiodicarbonic diamides; trithiodicarboxylic acids and salts; monothiocarbamates; (thio)cyanate ligands; or combinations thereof.

15. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the diazene selected from diazeneformimidamides, diazeneformamides, diazeneformothioamides, diazeneacetimidamides, diazeneacetothioamides, diazeneformimidic acids and salts, diazeneacetimidic acids and salts, diazenecarbothioic acids and salts, diazenecarbodithioic acids and salts, diazeneformimidothioic acids and salts, diazeneformaldehydes, diazeneformothioaldehydes, diazeneacetaldehydes, diazeneacetothioaldehydes, diazenediformamides, diazenediformothioamides, diazenediacetamides, diazenediacetothioamides, diazeneacetimidothioic acids and salts, imidoyldiazenes, diazenediformimidamides, diazenediacetimidamides, diazenediformimidic acids and salts, diazenediacetimidic acids and salts, diazenediformimidothioic acids and salts, diazenediacetimidothioic acids and salts, diazenedicarbothioic acids, diazenedicarbodithioic acids, diazeneformic acids, diazenediformic acids, diazeneacetic acids, diazenediacetic acids, diazenediformaldehydes, diazenediformothioaldehydes, diazenediacetaldehydes, diazenediacetothioaldehydes, diimidoyldiazenes, or combinations thereof.

16. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the thio-, amido-, or imido-derivative of hypophosphoric, phosphoric, or diphosphoric acids and salts selected from phosphoramidimidic triamides, phosphoramidimidic acids and salts, phosphorodiamidimidic acids and salts, phosphorodiamidimidothioic acids and salts, phosphoramidimidothioic acids and salts, phosphorodiamidimidodithioic acids and salts,

phosphoramidimidodithioic acids and salts, (di- or mono-)thiohypophosphoric acids and salts, (di- or mono-)thiohypophosphoramides, phosphoramidic acids and salts, phosphorimidic acids and salts, (di- or mono-)thioimidodiphosphoric acids and salts, (di- or mono-)thiohydrazidodiphosphoric acids and salts, (di- or mono-)thioimidodiphosphoramides, (di- or mono-)thiohydrazidodiphosphoramides, phosphoric triamides, (di- or mono-)thiodiphosphoramides, (di- or mono-)thiodiphosphoric acids and salts, (tetra-, tri-, di-)thiophosphoric acids and salts, phosphoro(dithioperoxo)(mono-,di-, or tri-)thioic acids and salts, phosphorimido(mono-, di-, or tri-)thioic acids and salts, phosphorothioic triamides, phosphoramido(mono, di- or tri-)thioic acids and salts, phosphorodiamido(mono, di- or tri-)thioic acids and salts, or combinations thereof.

17. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the ortho- (for aryl) or alpha- or beta- (for alkyl) substituted azo compound, triazene, formazan, azine, hydrazone, or Schiff Base having a substituent selected from amino, imino, oximo, diazeno, hydrazido, thiol, mercapto, thiocarbonyl, hydroxy, carbox, and carbonyl substituents, or combinations thereof.

18. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the oxime selected from monooximes, dioximes, carbonyl oximes, imine oximes, hydroxy oximes, amino oximes, amido oximes, hydrazone oximes, azo oximes, or combinations thereof.

19. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the amidine and imido compound selected from amidines, diamidines, biguanides, biguanidines, diamidinomethanes, imidoylguanidines, amidinoguanidines, diformamidine oxides, sulfides, and disulfides, imidodicarbonimidic acids and salts, diimidodicarbonimidic acids and salts, thioimidodicarbonimidic acids and salts, thiodiimidodicarbonimidic acids and salts, diimidoylimines, diimidoylhydrazides, imidosulfamides, diimidosulfamides, O-

amidinocarbamates, O- or S-amidino(mono-, di-, or peroxy-)thiocarbamates, N-hydroxy(or N,N'-dihydroxy)amidines, diimidosulfuric acids and salts, or combinations thereof.

20. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the dithio ligand selected from dithioimidodialdehydes, dithiohydrazidodialdehydes, dithioimidodicarbonic acids and salts, dithiohydrazidodicarbonic acids and salts, 1,3-dithioketones, 1,2-dithioketones, dithiomalonamides, 2-thioacylthioacetamides, dithioacyl sulfides, trithiodicarbonic diamides, (penta-, tetra-, tri-)thiodicarbonic acids and salts, beta-mercaptothioketones and –aldehydes, N-(aminomethylthiol)thioureas, dithiooxamides, 1,1-dithiolates, (di- or per-)thiomonocarboxylic acids and salts, (tetra- or per-)thiodicarboxylic acids and salts, (di-, tri-, or per-)thiocarbonates, dithiocarbamates (including N-hydroxydithiocarbamates and N-mercaptodithiocarbamates), dithiocarbazates, or combinations thereof.

21. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the amide selected from monoamides, lactams, amidinoamides, guanidinoamides, imidoylamides, polyamides, polylactams, or combinations thereof.

22. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the thio-, amido-, or imido-derivative of phosphonic and diphosphonic acids and salts selected from phosphonitrile amides, phosphonimidic diamides, phosphonamidimidic acids and salts, phosphonamidimidothioic acids and salts, dithioimidodiphosphonic acids and salts, dithiohydrazidodiphosphonic acids and salts, dithioimidodiphosphonamides, dithiohydrazidodiphosphonamides, dithiodiphosphonamides, dithiodiphosphonic acids and salts, dithioperoxydiphosphonamides, dithioperoxydiphosphonic acids and salts, (di- and tri-)thiophosphonic acids and salts, phosphono(dithioperoxo)thioic acids and salts, phosphono(dithioperoxo)dithioic acids and salts, phosphonimidothioic acids and salts, phosphonimidodithioic acids and salts, phosphonothioic acids and salts, phosphonanidothioic

acids and salts, phosphonamidimidodithioic acids and salts, monothioimidodiphosphonic acids and salts, monothiohydrazidodiphosphonic acids and salts, monothioimidodiphosphonamides, monothiohydrazidodiphosphonamides, monothiodiphosphonamides, monothiodiphosphonic acids and salts, monothioperoxydiphosphonamides, monothioperoxydiphosphonic acids and salts, monothiophosphonic acids and salts, phosphono(dithioperoxoic) acids and salts, or combinations thereof.

23. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the amido- or imido-derivative of hypophosphoric, phosphoric, or diphosphoric acids and salts containing no sulfur binding sites selected from hypophosphoric acids and salts, hypophosphoramides, imidodiphosphoric acids and salts, hydrazidodiphosphoric acids and salts, imidodiphosphoramides, hydrazidodiphosphoramides, diphosphoramides, or combinations thereof.

24. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the amido- or imido-derivative of phosphonic or diphosphonic acids and salts containing no sulfur binding sites selected from imidodiphosphonic acids and salts, hydrazidodiphosphonic acids and salts, imidodiphosphonamides, hydrazidodiphosphonamides, diphosphonamides, phosphonimidic acids and salts, phosphonamidic acids and salts, phosphonic diamides, or combinations thereof.

25. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the thiourea and thioamide selected from thioureas, thiocarboxamides, thioacylthioureas, acylthioureas, thioacylureas, thioaroylthioureas, aroylthioureas, thioaroylureas, thioimidates, thioguanylureas, guanidinothioureas, amidinothioamides, guanidinothioamides, imidoylthioamides, 3-aminothioacrylamides, thiohydrazides, thiosemicarbazides, (mono- and di-)thiobiurets, (mono- and di-)thioisobiurets, (mono- and di-)thiobiureas, N-(aminomethylol)thioureas, N-(aminomethylthiol)ureas, beta-mercaptocarboxamides, or combinations thereof.

26. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the biuret selected from biurets, triurets, isobiurets, biureas, triureas, acylureas, aroylureas, N-(aminomethylol)ureas, or combinations thereof.

27. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the monothio ligand selected from beta-aminothiones, 3-aminothioacrylic acids and salts, 3-mercapto-3-aminothioacrylic acids and salts, N-thioacyl benzylidenimines, thioimidodialdehydes, thiohydrazidodialdehydes, thioimidodicarbonic acids and salts, thiohydrazidodicarbonic acids and salts, 1,2-monothioketones, trithioperoxydicarbonic diamides, dithioperoxydicarbonic diamides, dithiodicarbonic acids and salts, trithioperoxydicarbonic acids and salts, beta-hydroxythioketones, beta-hydroxythioaldehydes, beta-mercaptoketones, beta-mercaptoaldehydes, monothiooxamides, beta-mercaptocarboxylic acids and salts, beta-mercaptothiocarboxylic acids and salts, beta-hydroxythiocarboxylic acids and salts, S-alkylthiocarboxylic acids and salts, S-arylthiocarboxylic acids and salts, S-alkyldisulfidocarboxylic acids and salts, S-aryldisulfidocarboxylic acids and salts, monothiomonocarboxylic acids and salts, dithiodicarboxylic acids and salts, monothiocarbonates, monothiocarbazates, monothiocarbimates, mercaptoalcohols, silylmercaptoalcohols, or combinations thereof.

28. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the diketone ligand selected from imidodialdehydes, hydrazidodialdehydes, imidodicarbonic acids and salts, hydrazidodicarbonic acids and salts, imidodisulfamic acids and salts, imidodisulfuric acids and salts, 1,3-diketones, 1,3,5-triketones, 1,2-diketones, 1,2,3-triketones, tropolonates, ortho-quinones, malonamides, 2-acylacetamides, monothiodicarbonic diamides, monothiodicarbonic acids and salts, trithionic acids and salts, oxamides, dicarboxylic acids, or combinations thereof.

29. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the S-(alkyl- or aryl-thio)thiocarboxylic acid and salt selected from S-(alkylthio)thiocarboxylic acids and salts, S-(arylthio)thiocarboxylic acids and salts, S,S-thiobisthiocarboxylic acids and salts, S-(alkyldisulfido)thiocarboxylic acids and salts, S-(aryldisulfido)thiocarboxylic acids and salts, S,S'-disulfidobisthiocarboxylic acids and salts, or combinations thereof.

30. (Original) The pigment of claim 13 wherein the organic valence stabilizer is the phosphine and arsine sulfide or oxide selected from phosphine P-sulfides, aminophosphine sulfides, arsine As-sulfides, aminoarsine sulfides, phosphine P-oxides, aminophosphine oxides, arsine As-oxides, aminoarsine oxides, or combinations thereof.

31. (Original) The pigment of claim 13 wherein a solubility in water of the rare earth/valence stabilizer complex is adjusted by an addition of a substituent group on the organic valence stabilizer.

32. (Original) The pigment of claim 31 wherein the solubility in water is increased by the addition of the substituent group selected from sulfonate groups ($-SO_3^-$), carboxyl groups ($-CO_2-$), hydroxyl groups (-OH), ester groups ($-CO_3-$), carbonyl groups (=C=O), amine groups ($-NH_2$), nitrosamine groups (=N-N=O), carbonylnitrene groups (-CO-N), sulfoxide groups (=S=O), sulfone groups ($=S[=O]_2$), sulfinyl groups (-N=S=O), sulfodiimines ($=S[=NH]_2$), sulfonyl halide groups ($-S[=O]_2X$), sulfonamide groups ($-S[=O]_2NH_2$), monohalosulfonamide groups ($-S[=O]_2NHX$), dihalosulfonamide groups ($-S[=O]_2MX_2$), halosulfonate groups ($-S[=O]_2OX$), halosulfonate amide groups ($=N-S[=O]_2X$), aminosulfonate groups ($=N-S[=O]_2OH$), iminosulfonate groups ($-N[SO_3^-]_{1-2}$), phosphonate groups ($-PO_3^{-2}$), phosphonamide groups ($-PO_2NH_2^-$), phosphondiamide groups ($-PO[NH_2]_2$), aminophosphonate groups ($=N-PO_3^{-2}$), iminophosphonate groups ($-N[PO_3^{-2}]_{1-2}$), or combinations thereof.

33. (Original) The pigment of claim 31 wherein the solubility in water is decreased by the addition of the substituent group selected from nitro groups ($-NO_2$), perfluoroalkyl groups ($-C_xF_{2x+1}$), perchloroalkyl groups ($-C_xCl_{2x+1}$), nitramine groups ($=N-NO_2$), thioketone groups ($=C=S$), sulfenyl halide groups (-S-X), sulfur dihaloimide groups ($-N=SX_2$), or combinations thereof.

34. (Original) The pigment of claim 13 wherein an electrostatic barrier layer of the rare earth/valence stabilizer complex is adjusted by an addition of a substituent group on the organic valence stabilizer.

35. (Original) The pigment of claim 34 wherein the electrostatic barrier layer is increased by the addition of the substituent group selected from ketones ($=C=O$), thioketones ($=C=S$), amides ($-C[=O]-NR_2$), thioamides (-C[=S]-NR2), nitriles or cyano groups (-CN), isocyanides (-NC), nitroso groups ($-N=O$), thionitroso groups ($-N=S$), nitro groups ($-NO_2$), azido groups ($-N_3$), cyanamide or cyanonitrene groups (=N-CN), cyanate groups (-O-CN), isocyanate groups (-N=C=O), thiocyanate groups (-S-CN), isothiocyanate groups (-N=C=S), nitrosamine groups ($=N-N=O$), thionitrosamine groups ($=N-N=S$), nitramine groups ($=N-NO_2$), thionitramine groups ($=N-NS_2$), carbonylnitrene groups (-CO-N), thiocarbonylnitrene groups (-CS-N), sulfenyl halides (-S-X), sulfoxides ($=S=O$), sulfones ($=S[=O]_2$), sulfinyl groups ($-N=S=O$), thiosulfinyl groups ($-N=S=S$), sulfenyl thiocyanato groups (-S-S-CN), sulfenyl cyanato groups (-S-O-CN), sulfodiimine groups ($=S[=NH]_2$), sulfur dihaloimido groups ($-N=SX_2$), sulfur oxide dihaloimido groups ($-N=S[=O]X_2$), aminosulfur oxide trihalide groups ($=N-S[=O]X_3$), sulfonyl azide groups ($-S[=O]_2N_3$), sulfonyl thiocyanate groups ($-S[=O]_2SCN$), sulfonyl cyanate groups ($-S[=O]_2OCN$), sulfonyl cyanide groups ($-S[=O]_2CN$), halosulfonate groups ($-S[=O]_2OX$), phosphonyl thiocyanate groups (-P[=O]OHSCN), phosphonyl cyanate groups (-P[=O]OHOCN), phosphonyl cyanide groups (-P[=O]OHCN), or combinations thereof.

36. (Original) The pigment of claim 1 further comprising a solubility control agent.

37. (Original) The pigment of claim 36 wherein the solubility control agent is a cationic solubility control agent or an anionic solubility control agent.

38. (Original) The pigment of claim 37 wherein the solubility control agent is the cationic solubility control agent selected from H^+; Li^+; Na^+; K^+; Rb^+; Cs^+; NH_4^+; Mg^{+2}; Ca^{+2}; Sr^{+2}; Be^{+2}; Ba^{+2}; Y^{+3}; La^{+3}; Ce^{+3}; Ce^{+4}; Nd^{+3}; Pr^{+3}; Sc^{+3}; Sm^{+3}; Eu^{+3}; Eu^{+2}; Gd^{+3}; Tb^{+3}; Dy^{+3}; Ho^{+3}; Er^{+3}; Tm^{+3}; Yb^{+3}; Lu^{+3}; Ti^{+4}; Zr^{+4}; Ti^{+3}; Hf^{+4}; Nb^{+5}; Ta^{+5}; Nb^{+4}; Ta^{+4}; V^{+5}; V^{+4}; V^{+3}; Mo^{+6}; W^{+6}; Mo^{+5}; W^{+5}; Mo^{+4}; W^{+4}; Cr^{+3}; Mn^{+2}; Mn^{+3}; Mn^{+4}; Fe^{+2}; Fe^{+3}; Co^{+2}; Co^{+3}; Ni^{+2}; Ni^{+3}; Ni^{+4}; Ru^{+2}; Ru^{+3}; Ru^{+4}; Rh^{+3}; Ir^{+3}; Rh^{+2}; Ir^{+2}; Pd^{+4}; Pt^{+4}; Pd^{+2}; Pt^{+2}; Os^{+4}; Cu^+; Cu^{+2}; Cu^{+3}; Ag^+; Ag^{+2}; Ag^{+3}; Au^+; Au^{+2}; Au^{+3}; Zn^{+2}; Cd^{+2}; Hg^+; Hg^{+2}; Al^{+3}; Ga^{+3}; Ga^+; In^{+3}; In^+; Tl^{+3}; Tl^+; Ge^{+4}; Ge^{+2}; Sn^{+4}; Sn^{+2}; Pb^{+4}; Pb^{+2}; Sb^{+3}; Sb^{+5}; As^{+3}; As^{+5}; Bi^{+3}; Bi^{+5}; organic compounds containing at least one N^+ site; organic compounds containing at least one phosphonium site; organic compounds containing at least one arsonium site; organic compounds containing at least one stibonium site; organic compounds containing at least one oxonium site; organic compounds containing at least one sulfonium site; organic compounds containing at least one selenonium site; organic compounds containing at least one iodonium site; quaternary ammonium compounds having a formula NR_4^+, where R is an alkyl, aromatic, or acyclic organic constituent; or combinations thereof.

39. (Original) The pigment of claim 38 wherein the cationic solubility control agent is selected from H^+; Li^+; Na^+; K^+; Rb^+; Cs^+; NH_4^+; Mg^{+2}; Ca^{+2}; Sr^{+2}; Y^{+3}; La^{+3}; Ce^{+3}; Ce^{+4}; Nd^{+3}; Pr^{+3}; Sc^{+3}; Sm^{+3}; Eu^{+3}; Eu^{+2}; Gd^{+3}; Tb^{+3}; Dy^{+3}; Ho^{+3}; Er^{+3}; Tm^{+3}; Yb^{+3}; Lu^{+3}; Ti^{+4}; Zr^{+4}; Ti^{+3}; Hf^{+4}; Nb^{+5}; Ta^{+5}; Nb^{+4}; Ta^{+4}; Mo^{+6}; W^{+6}; Mo^{+5}; W^{+5}; Mo^{+4}; W^{+4}; Mn^{+2}; Mn^{+3}; Mn^{+4}; Fe^{+2}; Fe^{+3}; Co^{+2}; Co^{+3}; Ru^{+2}; Ru^{+3}; Ru^{+4}; Rh^{+3}; Ir^{+3}; Rh^{+2}; Ir^{+2}; Pd^{+4}; Pt^{+4}; Pd^{+2}; Pt^{+2}; Cu^+; Cu^{+2}; Cu^{+3}; Ag^+; Ag^{+2}; Ag^{+3}; Au^+; Au^{+2}; Au^{+3}; Zn^{+2}; Al^{+3}; Ga^{+3}; Ga^+; In^{+3}; In^+; Ge^{+4}; Ge^{+2}; Sn^{+4}; Sn^{+2}; Sb^{+3}; Sb^{+5}; Bi^{+3}; Bi^{+5}; organic compounds containing at least one N^+ site; organic compounds containing at

least one phosphonium site; organic compounds containing at least one stibonium site; organic compounds containing at least one oxonium site; organic compounds containing at least one sulfonium site; organic compounds containing at least one iodonium site; quaternary ammonium compounds having a formula NR_4^+, where R is an alkyl, aromatic, or acyclic organic constituent; or combinations thereof.

40. (Original) The pigment of claim 37 wherein the solubility control agent is the anionic solubility control agent selected from fluorotitanates, chlorotitanates, fluorozirconates, chlorozirconates, fluoroniobates, chloroniobates, fluorotantalates, chlorotantalates, molybdates, tungstates, permanganates, fluoromanganates, chloromanganates, fluoroferrates, chloroferrates, fluorocobaltates, chlorocobaltates, fluorozincates, chlorozincates, borates, fluoroborates, fluoroaluminates, chloroaluminates, carbonates, silicates, fluorosilicates, fluorostannates, nitrates, nitrites, azides, cyanamides, phosphates, phosphites, phosphonates, phosphinites, thiophosphates, thiophosphites, thiophosphonates, thiophosphinites, fluorophosphates, fluoroantimonates, chloroantimonates, sulfates, sulfites, sulfonates, thiosulfates, dithionites, dithionates, fluorosulfates, tellurates, fluorides, chlorides, chlorates, perchlorates, bromides, bromates, iodides, iodates, periodates, heteropolyanions, ferricyanides, ferrocyanides, cyanocobaltates, cyanocuprates, cyanomanganates, cyanates, cyanatoferrates, cyanatocobaltates, cyanatocuprates, cyanatomanganates, thiocyanates, thiocyanatoferrates, thiocyanatocobaltates, thiocyanatocuprates, thiocyanatomanganates, cyanamides, cyanamidoferrates, cyanamidocobaltates, cyanamidocuprates, cyanamidomanganates, nitritoferrates, nitritocobaltates, azides, (thio)carboxylates, di(thio)carboxylates, tri(thio)carboxylates, tetra(thio)carboxylates, (thio)phenolates, di(thio)phenolates, tri(thio)phenolates, tetra(thio)phenolates, (thio)phosphonates, di(thio)phosphonates, tri(thio)phosphonates, (thio)phosphonamides, di(thio)phosphonamides, tri(thio)phosphonamides, amino(thio)phosphonates, diamino(thio)phosphonates, triamino(thio)phosphonates, imino(thio)phosphonates, diimino(thio)phosphonates, (thio)sulfonates, di(thio)sulfonates,

tri(thio)sulfonates, (thio)sulfonamides, di(thio)sulfonamides, tri(thio)sulfonamides, amino(thio)sulfonates, diamino(thio)sulfonates, triamino(thio)sulfonates, imino(thio)sulfonates, diimino(thio)sulfonates, (thio)borates, di(thio)borates, (thio)boronates, organic silicates, stibonates, cyanides, cyanochromates, cyanonickelates, cyanatochromates, cyanatonickelates, thiocyanatochromates, thiocyanatonickelates, cyanamidochromates, cyanamidonickelates, nitritonickelates, arsonates, diarsonates, triarsonates, organic selenates, diselenates, triselenates, arsenates, arsenites, fluoroarsenates, chloroarsenates, selenates, selenites, fluorothallates, chlorothallates, iodomercury anions, chloromercurates, bromomercurates, osmates, fluoronickelates, chromates, Reinecke's salt, vanadates, or combinations thereof.

41. (Original) The pigment of claim 40 wherein the anionic solubility control agent is selected from fluorotitanates, chlorotitanates, fluorozirconates, chlorozirconates, fluoroniobates, chloroniobates, fluorotantalates, chlorotantalates, molybdates, tungstates, permanganates, fluoromanganates, chloromanganates, fluoroferrates, chloroferrates, fluorocobaltates, chlorocobaltates, fluorozincates, chlorozincates, borates, fluoroborates, fluoroaluminates, chloroaluminates, carbonates, silicates, fluorosilicates, fluorostannates, nitrates, nitrites, azides, cyanamides, phosphates, phosphites, phosphonates, phosphinites, thiophosphates, thiophosphites, thiophosphonates, thiophosphinites, fluorophosphates, fluoroantimonates, chloroantimonates, sulfates, sulfites, sulfonates, thiosulfates, dithionites, dithionates, fluorosulfates, tellurates, fluorides, chlorides, chlorates, perchlorates, bromides, bromates, iodides, iodates, periodates, heteropolyanions, ferricyanides, ferrocyanides, cyanocobaltates, cyanocuprates, cyanomanganates, cyanates, cyanatoferrates, cyanatocobaltates, cyanatocuprates, cyanatomanganates, thiocyanates, thiocyanatoferrates, thiocyanatocobaltates, thiocyanatocuprates, thiocyanatomanganates, cyanamides, cyanamidoferrates, cyanamidocobaltates, cyanamidocuprates, cyanamidomanganates, nitritoferrates, nitritocobaltates, azides, (thio)carboxylates, di(thio)carboxylates, tri(thio)carboxylates, tetra(thio)carboxylates, (thio)phenolates, di(thio)phenolates, tri(thio)phenolates,

tetra(thio)phenolates, (thio)phosphonates, di(thio)phosphonates, tri(thio)phosphonates, (thio)phosphonamides, di(thio)phosphonamides, tri(thio)phosphonamides, amino(thio)phosphonates, diamino(thio)phosphonates, triamino(thio)phosphonates, imino(thio)phosphonates, diimino(thio)phosphonates, (thio)sulfonates, di(thio)sulfonates, tri(thio)sulfonates, (thio)sulfonamides, di(thio)sulfonamides, tri(thio)sulfonamides, amino(thio)sulfonates, diamino(thio)sulfonates, triamino(thio)sulfonates, imino(thio)sulfonates, diimino(thio)sulfonates, (thio)borates, di(thio)borates, (thio)boronates, organic silicates, stibonates, or combinations thereof.

42. (Original) The pigment of claim 1 wherein the rare earth/valence stabilizer complex is adsorbed or mixed onto, into, or with an inert medium selected from oxides, hydroxides, phosphates, borates, silicates, carbonates, aluminates, titanates, molybdates, tungstates, oxalates, polymers, or combinations thereof.

43. (Original) The pigment of claim 1 wherein the pigment is colored.

44. (Original) The pigment of claim 1 wherein the pigment exhibits a color change between trivalent and tetravalent oxidation states.

45. (Original) The pigment of claim 1 wherein the pigment is light-fast.

46. (Currently Amended) A method of making a corrosion-inhibiting pigment <u>composition</u> comprising:

providing a solvent;

providing a rare earth source in the solvent forming a rare earth solution, wherein the rare earth source is selected from a cerium source, a terbium source, a praseodymium source, or a combination thereof, and at least one rare earth source is in the tetravalent oxidation state;

providing a valence stabilizer; [[and]]

combining the rare earth source and the valence stabilizer to form a rare earth/valence stabilizer complex; and

combining the rare/earth/valence stabilizer complex with a coating system selected from a carrier system, a binder system, or a resin system,

wherein the rare earth/valence stabilizer complex has a solubility in water of between about 1×10^{0} and about 1×10^{-5} moles per liter of manganese at about 25°C and about 760 Torr.

47. (Original) The method of claim 46 wherein

the cerium source is selected from a trivalent cerium source, a tetravalent cerium source, or a combination thereof;

the terbium source is selected from a trivalent terbium source, a tetravalent terbium source, or a combination thereof; and

the praseodymium source is selected from a trivalent praseodymium source, a tetravalent praseodymium source, or a combination thereof.

48. (Original) The method of claim 46 further comprising oxidizing the rare earth source to obtain the at least one rare earth source in the tetravalent oxidation state.

49. (Original) The method of claim 48 wherein the rare earth source is oxidized by adding an oxidizer to the rare earth solution.

50. (Original) The method of claim 49 wherein the oxidizer is a dissolved solid, a liquid, or a gas.

51. (Original) The method of claim 49 wherein the oxidizer is selected from peroxides, superoxides, persulfates, perborates, pernitrates, perphosphates, percarbonates, persilicates,

peraluminates, pertitanates, perzirconates, permolybdates, pertungstates, pervanadates, organic peroxyacid derivatives, ozone, hypochlorites, chlorates, perchlorates, nitrates, nitrites, vanadates, iodates, hypobromites, chlorites, bromates, permanganates, periodates, dissolved oxygen, dissolved chlorine, dissolved fluorine, or combinations thereof.

52. (Original) The method of claim 48 wherein the rare earth source is oxidized by electrolysis.

53. (Original) The method of claim 46 wherein the rare earth/valence stabilizer complex is formed by a process selected from precipitation, evaporation, salting out with chemicals, freezing, freeze drying, or firing at an elevated temperature.

54. (Original) The method of claim 53 wherein the rare earth/valence stabilizer complex is formed by precipitation.

55. (Original) The method of claim 46 wherein the cerium source is selected from cerium (III) nitrate, cerium (III) sulfate, cerium (III) perchlorate, cerium (III) chloride, cerium (III) fluoride, cerium (III) bromide, cerium (III) iodide, cerium (III) bromate, cerium (III) fluosilicate, cerium (III) fluotitanate, cerium (III) fluozirconate, cerium (III) fluoborate, cerium (III) fluoaluminate, cerium (III) formate, cerium (III) acetate, cerium (III) propionate, cerium (III) butyrate, cerium (III) benzoate, cerium (III) glycolate, cerium (III) lactate, cerium (III) sulfonate, cerium (III) alkylsulfonate, cerium (III) alkoxysulfonate, cerium (III) aromatic sulfonate, cerium (III) aromatoxysulfonate, cerium (III) sulfamate, cerium (III) alkylphosphates, cerium (III) acetylacetonate, ammonium cerium (III) sulfate, ammonium cerium (III) nitrate, ammonium cerium (III) oxalate, magnesium cerium (III) sulfate, magnesium cerium (III) nitrate, alkali metal cerium (III) nitrate, alkali metal cerium (III) sulfate, cerium (III) carbonate, cerium (III) phosphate, cerium (III) sulfide, cerium (III) fluorocarbonate, cerium (III) oxalate, cerium (III)

malonate, cerium (III) tartrate, cerium (III) malate, cerium (III) citrate, cerium (III) salicylate, cerium (III) hydroxide, cerium (III) oxide, cerium (III) thiocyanate, cerium (IV) chloride, cerium (IV) fluoride, cerium (IV) perchlorate, cerium (IV) sulfate, cerium (IV) nitrate, cerium (IV) acetate, cerium (IV) propionate, cerium (IV) butyrate, ammonium cerium (IV) nitrate, ammonium cerium (IV) sulfate, magnesium cerium (IV) nitrate, magnesium cerium (IV) sulfate, alkali metal cerium (IV) nitrate, and alkali metal cerium (IV) sulfate, cerium (IV) hydroxide, cerium (IV) oxide, cerium (IV) sulfide, bastnaesite, monazite, xenotime, loparite, lanthanite, rhabdophane, fergusonite, cebaite, aeschynite, lucasite, stillwellite, samarskite, parisite, gadolinite, fluocerite, cerianite, churchite, or combinations thereof.

56. (Original) The method of claim 46 wherein the praseodymium source is selected from praseodymium nitrate, praseodymium sulfate, praseodymium perchlorate, praseodymium chloride, praseodymium fluoride, praseodymium bromide, praseodymium iodide, praseodymium bromate, praseodymium fluosilicate, praseodymium fluotitanate, praseodymium fluozirconate, praseodymium fluoborate, praseodymium fluoaluminate, praseodymium formate, praseodymium acetate, praseodymium propionate, praseodymium lactate, praseodymium benzenesulfonate, praseodymium acetylacetonate, ammonium praseodymium sulfate, ammonium praseodymium nitrate, magnesium praseodymium sulfate, magnesium praseodymium nitrate, alkali metal praseodymium nitrate, alkali metal praseodymium sulfate, praseodymium carbonate, praseodymium phosphate, praseodymium sulfide, praseodymium benzoate, praseodymium oxalate, praseodymium malonate, praseodymium tartrate, praseodymium malate, praseodymium citrate, praseodymium salicylate, praseodymium hydroxide, praseodymium thiocyanate, praseodymium oxide, bastnaesite, monazite, xenotime, loparite, lanthanite, rhabdophane, fergusonite, cebaite, aeschynite, lucasite, stillwellite, samarskite, parisite, gadolinite, fluocerite, cerianite, churchite, or combinations thereof.

57. (Original) The method of claim 46 wherein the terbium source is selected from terbium nitrate, terbium sulfate, terbium perchlorate, terbium chloride, terbium fluoride, terbium bromide, terbium iodide, terbium bromate, terbium fluosilicate, terbium fluotitanate, terbium fluozirconate, terbium fluoborate, terbium fluoaluminate, terbium formate, terbium acetate, terbium propionate, terbium lactate, terbium benzenesulfonate, terbium acetylacetonate, ammonium terbium sulfate, ammonium terbium nitrate, magnesium terbium sulfate, magnesium terbium nitrate, alkali metal terbium nitrate, alkali metal terbium sulfate, terbium carbonate, terbium phosphate, terbium sulfide, terbium benzoate, terbium oxalate, terbium malonate, terbium tartrate, terbium malate, terbium citrate, terbium salicylate, terbium hydroxide, terbium thiocyanate, terbium oxide, bastnaesite, monazite, xenotime, loparite, lanthanite, rhabdophane, fergusonite, cebaite, aeschynite, lucasite, stillwellite, samarskite, parisite, gadolinite, fluocerite, cerianite, churchite, or combinations thereof.

58. (Original) The method of claim 46 wherein the solvent comprises water.

59. (Original) The method of claim 46 wherein the solvent comprises an organic solvent.

60. (Original) The method of claim 59 wherein the organic solvent is methanol, ethanol, n-propanol, isopropanol, n-butanol, isobutanol, sec-butanol, benzyl alcohol, glycerol, ethylene glycol, propylene glycol, cresol, cyclohexanol, butyl Carbitol, Cellosolve, methyl Cellosolve, ethyl lactate, acetone, methyl ethyl ketone, diethyl ketone, methyl isobutyl ketone, cyclohexanone, acetophenone, diethyl ether, isopropyl ether, furan, tetrahydrofuran, dioxane, tetrahydropyran, methyl formate, ethyl formate, methyl acetate, ethyl acetate, methyl propionate, ethyl propionate, methyl butyrate, ethyl butyrate, propylene oxide, acetic acid, propionic acid, butyrolactone, ethylene carbonate, propylene carbonate, benzaldehyde, propyl amine, diethyl amine, ethanolamine, aniline, pyridine, acetonitrile, dimethylformamide, propionitrile, nitrobenzene, hexane, heptane, octane, nonane, decane, undecane, dodecane, cyclohexane,

benzene, toluene, xylene, mineral spirits, kerosene, gasoline, carbon tetrachloride, chloroform, methylene chloride, dichloroethane, trichloroethane, trichloroethylene, chlorobenzene, Freon 113, Stoddard's solvent, carbon disulfide, dimethyl sulfoxide, hexamethylphosphoric triamide, or combinations thereof.

61. (Original) The method of claim 46 wherein the valence stabilizer is an inorganic valence stabilizer or an organic valence stabilizer.

62. (Original) The method of claim 46 further comprising providing a solubility control agent.

63. (Original) The method of claim 62 wherein the solubility control agent is a cationic solubility control agent or an anionic solubility control agent.

64. (Original) The method of claim 63 wherein the solubility control agent is the cationic solubility control agent selected from H^+; Li^+; Na^+; K^+; Rb^+; Cs^+; NH_4^+; Mg^{+2}; Ca^{+2}; Sr^{+2}; Be^{+2}; Ba^{+2}; Y^{+3}; La^{+3}; Ce^{+3}; Ce^{+4}; Nd^{+3}; Pr^{+3}; Sc^{+3}; Sm^{+3}; Eu^{+3}; Eu^{+2}; Gd^{+3}; Tb^{+3}; Dy^{+3}; Ho^{+3}; Er^{+3}; Tm^{+3}; Yb^{+3}; Lu^{+3}; Ti^{+4}; Zr^{+4}; Ti^{+3}; Hf^{+4}; Nb^{+5}; Ta^{+5}; Nb^{+4}; Ta^{+4}; V^{+5}; V^{+4}; V^{+3}; Mo^{+6}; W^{+6}; Mo^{+5}; W^{+5}; Mo^{+4}; W^{+4}; Cr^{+3}; Mn^{+2}; Mn^{+3}; Mn^{+4}; Fe^{+2}; Fe^{+3}; Co^{+2}; Co^{+3}; Ni^{+2}; Ni^{+3}; Ni^{+4}; Ru^{+2}; Ru^{+3}; Ru^{+4}; Rh^{+3}; Ir^{+3}; Rh^{+2}; Ir^{+2}; Pd^{+4}; Pt^{+4}; Pd^{+2}; Pt^{+2}; Os^{+4}; Cu^+; Cu^{+2}; Cu^{+3}; Ag^+; Ag^{+2}; Ag^{+3}; Au^+; Au^{+2}; Au^{+3}; Zn^{+2}; Cd^{+2}; Hg^+; Hg^{+2}; Al^{+3}; Ga^{+3}; Ga^+; In^{+3}; In^+; Tl^{+3}; Tl^+; Ge^{+4}; Ge^{+2}; Sn^{+4}; Sn^{+2}; Pb^{+4}; Pb^{+2}; Sb^{+3}; Sb^{+5}; As^{+3}; As^{+5}; Bi^{+3}; Bi^{+5}; organic compounds containing at least one N^+ site; organic compounds containing at least one phosphonium site; organic compounds containing at least one arsonium site; organic compounds containing at least one stibonium site; organic compounds containing at least one oxonium site; organic compounds containing at least one sulfonium site; organic compounds containing at least one selenonium site; organic compounds

containing at least one iodonium site; quaternary ammonium compounds having a formula NR_4^+, where R is an alkyl, aromatic, or acyclic organic constituent; or combinations thereof.

65. (Original) The method of claim 64 wherein the cationic solubility control agent is selected from H^+; Li^+; Na^+; K^+; Rb^+; Cs^+; NH_4^+; Mg^{+2}; Ca^{+2}; Sr^{+2}; Y^{+3}; La^{+3}; Ce^{+3}; Ce^{+4}; Nd^{+3}; Pr^{+3}; Sc^{+3}; Sm^{+3}; Eu^{+3}; Eu^{+2}; Gd^{+3}; Tb^{+3}; Dy^{+3}; Ho^{+3}; Er^{+3}; Tm^{+3}; Yb^{+3}; Lu^{+3}; Ti^{+4}; Zr^{+4}; Ti^{+3}; Hf^{+4}; Nb^{+5}; Ta^{+5}; Nb^{+4}; Ta^{+4}; Mo^{+6}; W^{+6}; Mo^{+5}; W^{+5}; Mo^{+4}; W^{+4}; Mn^{+2}; Mn^{+3}; Mn^{+4}; Fe^{+2}; Fe^{+3}; Co^{+2}; Co^{+3}; Ru^{+2}; Ru^{+3}; Ru^{+4}; Rh^{+3}; Ir^{+3}; Rh^{+2}; Ir^{+2}; Pd^{+4}; Pt^{+4}; Pd^{+2}; Pt^{+2}; Cu^+; Cu^{+2}; Cu^{+3}; Ag^+; Ag^{+2}; Ag^{+3}; Au^+; Au^{+2}; Au^{+3}; Zn^{+2}; Al^{+3}; Ga^{+3}; Ga^+; In^{+3}; In^+; Ge^{+4}; Ge^{+2}; Sn^{+4}; Sn^{+2}; Sb^{+3}; Sb^{+5}; Bi^{+3}; Bi^{+5}; organic compounds containing at least one N^+ site; organic compounds containing at least one phosphonium site; organic compounds containing at least one stibonium site; organic compounds containing at least one oxonium site; organic compounds containing at least one sulfonium site; organic compounds containing at least one iodonium site; quaternary ammonium compounds having a formula NR_4^+, where R is an alkyl, aromatic, or acyclic organic constituent; or combinations thereof.

66. (Original) The method of claim 63 wherein the solubility control agent is the anionic solubility control agent selected from fluorotitanates, chlorotitanates, fluorozirconates, chlorozirconates, fluoroniobates, chloroniobates, fluorotantalates, chlorotantalates, molybdates, tungstates, permanganates, fluoromanganates, chloromanganates, fluoroferrates, chloroferrates, fluorocobaltates, chlorocobaltates, fluorozincates, chlorozincates, borates, fluoroborates, fluoroaluminates, chloroaluminates, carbonates, silicates, fluorosilicates, fluorostannates, nitrates, nitrites, azides, cyanamides, phosphates, phosphites, phosphonates, phosphinites, thiophosphates, thiophosphites, thiophosphonates, thiophosphinites, fluorophosphates, fluoroantimonates, chloroantimonates, sulfates, sulfites, sulfonates, thiosulfates, dithionites, dithionates, fluorosulfates, tellurates, fluorides, chlorides, chlorates, perchlorates, bromides, bromates, iodides, iodates, periodates, heteropolyanions, ferricyanides, ferrocyanides,

cyanocobaltates, cyanocuprates, cyanomanganates, cyanates, cyanatoferrates, cyanatocobaltates, cyanatocuprates, cyanatomanganates, thiocyanates, thiocyanatoferrates, thiocyanatocobaltates, thiocyanatocuprates, thiocyanatomanganates, cyanamides, cyanamidoferrates, cyanamidocobaltates, cyanamidocuprates, cyanamidomanganates, nitritoferrates, nitritocobaltates, azides, (thio)carboxylates, di(thio)carboxylates, tri(thio)carboxylates, tetra(thio)carboxylates, (thio)phenolates, di(thio)phenolates, tri(thio)phenolates, tetra(thio)phenolates, (thio)phosphonates, di(thio)phosphonates, tri(thio)phosphonates, (thio)phosphonamides, di(thio)phosphonamides, tri(thio)phosphonamides, amino(thio)phosphonates, diamino(thio)phosphonates, triamino(thio)phosphonates, imino(thio)phosphonates, diimino(thio)phosphonates, (thio)sulfonates, di(thio)sulfonates, tri(thio)sulfonates, (thio)sulfonamides, di(thio)sulfonamides, tri(thio)sulfonamides, amino(thio)sulfonates, diamino(thio)sulfonates, triamino(thio)sulfonates, imino(thio)sulfonates, diimino(thio)sulfonates, (thio)borates, di(thio)borates, (thio)boronates, organic silicates, stibonates, cyanides, cyanochromates, cyanonickelates, cyanatochromates, cyanatonickelates, thiocyanatochromates, thiocyanatonickelates, cyanamidochromates, cyanamidonickelates, nitritonickelates, arsonates, diarsonates, triarsonates, organic selenates, diselenates, triselenates, arsenates, arsenites, fluoroarsenates, chloroarsenates, selenates, selenites, fluorothallates, chlorothallates, iodomercury anions, chloromercurates, bromomercurates, osmates, fluoronickelates, chromates, Reinecke's salt, vanadates, or combinations thereof.

67. (Original) The method of claim 66 wherein the anionic solubility control agent is selected from fluorotitanates, chlorotitanates, fluorozirconates, chlorozirconates, fluoroniobates, chloroniobates, fluorotantalates, chlorotantalates, molybdates, tungstates, permanganates, fluoromanganates, chloromanganates, fluoroferrates, chloroferrates, fluorocobaltates, chlorocobaltates, fluorozincates, chlorozincates, borates, fluoroborates, fluoroaluminates, chloroaluminates, carbonates, silicates, fluorosilicates, fluorostannates, nitrates, nitrites, azides, cyanamides, phosphates, phosphites, phosphonates, phosphinites, thiophosphates,

thiophosphites, thiophosphonates, thiophosphinites, fluorophosphates, fluoroantimonates, chloroantimonates, sulfates, sulfites, sulfonates, thiosulfates, dithionites, dithionates, fluorosulfates, tellurates, fluorides, chlorides, chlorates, perchlorates, bromides, bromates, iodides, iodates, periodates, heteropolyanions, ferricyanides, ferrocyanides, cyanocobaltates, cyanocuprates, cyanomanganates, cyanates, cyanatoferrates, cyanatocobaltates, cyanatocuprates, cyanatomanganates, thiocyanates, thiocyanatoferrates, thiocyanatocobaltates, thiocyanatocuprates, thiocyanatomanganates, cyanamides, cyanamidoferrates, cyanamidocobaltates, cyanamidocuprates, cyanamidomanganates, nitritoferrates, nitritocobaltates, azides, (thio)carboxylates, di(thio)carboxylates, tri(thio)carboxylates, tetra(thio)carboxylates, (thio)phenolates, di(thio)phenolates, tri(thio)phenolates, tetra(thio)phenolates, (thio)phosphonates, di(thio)phosphonates, tri(thio)phosphonates, (thio)phosphonamides, di(thio)phosphonamides, tri(thio)phosphonamides, amino(thio)phosphonates, diamino(thio)phosphonates, triamino(thio)phosphonates, imino(thio)phosphonates, diimino(thio)phosphonates, (thio)sulfonates, di(thio)sulfonates, tri(thio)sulfonates, (thio)sulfonamides, di(thio)sulfonamides, tri(thio)sulfonamides, amino(thio)sulfonates, diamino(thio)sulfonates, triamino(thio)sulfonates, imino(thio)sulfonates, diimino(thio)sulfonates, (thio)borates, di(thio)borates, (thio)boronates, organic silicates, stibonates, or combinations thereof.

68. (Original) The method of claim 46 wherein the valence stabilizer is provided by adding it to the rare earth solution.

69. (Original) The method of claim 46 wherein the valence stabilizer is provided as a separate solution.

70. (Original) The method of claim 62 wherein the solubility control agent is provided by adding the solubility control agent to the rare earth solution.

71. (Original) The method of claim 62 whereby the solubility control agent is provided by adding the solubility control agent to a separate solution containing the valence stabilizer.

72. (Original) The method of claim 62 wherein the solubility control agent is provided as a separate solution.

73. (Original) The method of claim 46 further comprising heating the rare earth solution.

74. (Original) The method of claim 46 further comprising cooling the rare earth solution.

75. (Original) The method of claim 46 further comprising adjusting the pH of the rare earth solution using a compound selected from acids or bases.

76. (Original) The method of claim 46 further comprising adsorbing or mixing the rare earth/valence stabilizer complex onto, into, or with an inert medium selected from oxides, hydroxides, phosphates, borates, silicates, carbonates, aluminates, titanates, molybdates, tungstates, oxalates, polymers, or combinations thereof.

77. (Currently Amended) A method for treating a surface for corrosion resistance, comprising:

providing a substrate to be coated; and

applying a corrosion-inhibiting pigment composition comprising a corrosion-inhibiting pigment comprising a rare earth source and a valence stabilizer combined to form a rare earth/valence stabilizer complex, wherein the rare earth source is selected from a cerium source, a terbium source, a praseodymium source, or a combination thereof, and at least one rare earth source is in the tetravalent oxidation state, and wherein the rare earth/valence stabilizer complex has a solubility in water of between about 1×10^{0} and about 1×10^{-5} moles per liter of cerium,

terbium, or praseodymium at about 25°C and about 760 Torr; and a coating system selected from a carrier system, a binder system, or a resin system.

78. (Canceled)

79. (Original) The method of claim 78 wherein the solubility of the rare earth/valence stabilizer complex in water is between about 1×10^{-1} and about 1×10^{-4} moles per liter of cerium, terbium, or praseodymium at about 25°C and about 760 Torr.

80. (Original) The method of claim 77 wherein there is an electrostatic barrier layer around the rare earth/valence stabilizer complex in aqueous solution.

81. (Original) The method of claim 77 wherein the rare earth/valence stabilizer complex acts as an ion exchange agent towards corrosive ions.

82. (Original) The method of claim 77 wherein the rare earth/valence stabilizer complex decomposes at a temperature above about 100°C.

83. (Original) The method of claim 77 wherein the rare earth/valence stabilizer complex melts at a temperature above about 50°C.

84. (Original) The method of claim 77 wherein the valence stabilizer is an inorganic valence stabilizer or an organic valence stabilizer.

85. (Original) The method of claim 78 wherein the rare earth/valence stabilizer complex further comprises a solubility control agent.

86. (Original) The method of claim 85 wherein the solubility control agent is a cationic solubility control agent or an anionic solubility control agent.

87. (Original) The method of claim 86 wherein the solubility control agent is the cationic solubility control agent selected from H^+; Li^+; Na^+; K^+; Rb^+; Cs^+; NH_4^+; Mg^{+2}; Ca^{+2}; Sr^{+2}; Be^{+2}; Ba^{+2}; Y^{+3}; La^{+3}; Ce^{+3}; Ce^{+4}; Nd^{+3}; Pr^{+3}; Sc^{+3}; Sm^{+3}; Eu^{+3}; Eu^{+2}; Gd^{+3}; Tb^{+3}; Dy^{+3}; Ho^{+3}; Er^{+3}; Tm^{+3}; Yb^{+3}; Lu^{+3}; Ti^{+4}; Zr^{+4}; Ti^{+3}; Hf^{+4}; Nb^{+5}; Ta^{+5}; Nb^{+4}; Ta^{+4}; V^{+5}; V^{+4}; V^{+3}; Mo^{+6}; W^{+6}; Mo^{+5}; W^{+5}; Mo^{+4}; W^{+4}; Cr^{+3}; Mn^{+2}; Mn^{+3}; Mn^{+4}; Fe^{+2}; Fe^{+3}; Co^{+2}; Co^{+3}; Ni^{+2}; Ni^{+3}; Ni^{+4}; Ru^{+2}; Ru^{+3}; Ru^{+4}; Rh^{+3}; Ir^{+3}; Rh^{+2}; Ir^{+2}; Pd^{+4}; Pt^{+4}; Pd^{+2}; Pt^{+2}; Os^{+4}; Cu^+; Cu^{+2}; Cu^{+3}; Ag^+; Ag^{+2}; Ag^{+3}; Au^+; Au^{+2}; Au^{+3}; Zn^{+2}; Cd^{+2}; Hg^+; Hg^{+2}; Al^{+3}; Ga^{+3}; Ga^+; In^{+3}; In^+; Tl^{+3}; Tl^+; Ge^{+4}; Ge^{+2}; Sn^{+4}; Sn^{+2}; Pb^{+4}; Pb^{+2}; Sb^{+3}; Sb^{+5}; As^{+3}; As^{+5}; Bi^{+3}; Bi^{+5}; organic compounds containing at least one N^+ site; organic compounds containing at least one phosphonium site; organic compounds containing at least one arsonium site; organic compounds containing at least one stibonium site; organic compounds containing at least one oxonium site; organic compounds containing at least one sulfonium site; organic compounds containing at least one selenonium site; organic compounds containing at least one iodonium site; quaternary ammonium compounds having a formula NR_4^+, where R is an alkyl, aromatic, or acyclic organic constituent; or combinations thereof.

88. (Original) The method of claim 87 wherein the cationic solubility control agent is selected from H^+; Li^+; Na^+; K^+; Rb^+; Cs^+; NH_4^+; Mg^{+2}; Ca^{+2}; Sr^{+2}; Y^{+3}; La^{+3}; Ce^{+3}; Ce^{+4}; Nd^{+3}; Pr^{+3}; Sc^{+3}; Sm^{+3}; Eu^{+3}; Eu^{+2}; Gd^{+3}; Tb^{+3}; Dy^{+3}; Ho^{+3}; Er^{+3}; Tm^{+3}; Yb^{+3}; Lu^{+3}; Ti^{+4}; Zr^{+4}; Ti^{+3}; Hf^{+4}; Nb^{+5}; Ta^{+5}; Nb^{+4}; Ta^{+4}; Mo^{+6}; W^{+6}; Mo^{+5}; W^{+5}; Mo^{+4}; W^{+4}; Mn^{+2}; Mn^{+3}; Mn^{+4}; Fe^{+2}; Fe^{+3}; Co^{+2}; Co^{+3}; Ru^{+2}; Ru^{+3}; Ru^{+4}; Rh^{+3}; Ir^{+3}; Rh^{+2}; Ir^{+2}; Pd^{+4}; Pt^{+4}; Pd^{+2}; Pt^{+2}; Cu^+; Cu^{+2}; Cu^{+3}; Ag^+; Ag^{+2}; Ag^{+3}; Au^+; Au^{+2}; Au^{+3}; Zn^{+2}; Al^{+3}; Ga^{+3}; Ga^+; In^{+3}; In^+; Ge^{+4}; Ge^{+2}; Sn^{+4}; Sn^{+2}; Sb^{+3}; Sb^{+5}; Bi^{+3}; Bi^{+5}; organic compounds containing at least one N^+ site; organic compounds containing at least one phosphonium site; organic compounds containing at least one stibonium site; organic compounds containing at least one oxonium site; organic compounds containing at least one

sulfonium site; organic compounds containing at least one iodonium site; quaternary ammonium compounds having a formula NR_4^+, where R is an alkyl, aromatic, or acyclic organic constituent; or combinations thereof.

89. (Original) The method of claim 86 wherein the solubility control agent is the anionic solubility control agent is selected from fluorotitanates, chlorotitanates, fluorozirconates, chlorozirconates, fluoroniobates, chloroniobates, fluorotantalates, chlorotantalates, molybdates, tungstates, permanganates, fluoromanganates, chloromanganates, fluoroferrates, chloroferrates, fluorocobaltates, chlorocobaltates, fluorozincates, chlorozincates, borates, fluoroborates, fluoroaluminates, chloroaluminates, carbonates, silicates, fluorosilicates, fluorostannates, nitrates, nitrites, azides, cyanamides, phosphates, phosphites, phosphonates, phosphinites, thiophosphates, thiophosphites, thiophosphonates, thiophosphinites, fluorophosphates, fluoroantimonates, chloroantimonates, sulfates, sulfites, sulfonates, thiosulfates, dithionites, dithionates, fluorosulfates, tellurates, fluorides, chlorides, chlorates, perchlorates, bromides, bromates, iodides, iodates, periodates, heteropolyanions, ferricyanides, ferrocyanides, cyanocobaltates, cyanocuprates, cyanomanganates, cyanates, cyanatoferrates, cyanatocobaltates, cyanatocuprates, cyanatomanganates, thiocyanates, thiocyanatoferrates, thiocyanatocobaltates, thiocyanatocuprates, thiocyanatomanganates, cyanamides, cyanamidoferrates, cyanamidocobaltates, cyanamidocuprates, cyanamidomanganates, nitritoferrates, nitritocobaltates, azides, (thio)carboxylates, di(thio)carboxylates, tri(thio)carboxylates, tetra(thio)carboxylates, (thio)phenolates, di(thio)phenolates, tri(thio)phenolates, tetra(thio)phenolates, (thio)phosphonates, di(thio)phosphonates, tri(thio)phosphonates, (thio)phosphonamides, di(thio)phosphonamides, tri(thio)phosphonamides, amino(thio)phosphonates, diamino(thio)phosphonates, triamino(thio)phosphonates, imino(thio)phosphonates, diimino(thio)phosphonates, (thio)sulfonates, di(thio)sulfonates, tri(thio)sulfonates, (thio)sulfonamides, di(thio)sulfonamides, tri(thio)sulfonamides, amino(thio)sulfonates, diamino(thio)sulfonates, triamino(thio)sulfonates, imino(thio)sulfonates,

diimino(thio)sulfonates, (thio)borates, di(thio)borates, (thio)boronates, organic silicates, stibonates, cyanides, cyanochromates, cyanonickelates, cyanatochromates, cyanatonickelates, thiocyanatochromates, thiocyanatonickelates, cyanamidochromates, cyanamidonickelates, nitritonickelates, arsonates, diarsonates, triarsonates, organic selenates, diselenates, triselenates, arsenates, arsenites, fluoroarsenates, chloroarsenates, selenates, selenites, fluorothallates, chlorothallates, iodomercury anions, chloromercurates, bromomercurates, osmates, fluoronickelates, chromates, Reinecke's salt, vanadates, or combinations thereof.

90. (Original) The method of claim 89 wherein the anionic solubility control agent is selected from fluorotitanates, chlorotitanates, fluorozirconates, chlorozirconates, fluoroniobates, chloroniobates, fluorotantalates, chlorotantalates, molybdates, tungstates, permanganates, fluoromanganates, chloromanganates, fluoroferrates, chloroferrates, fluorocobaltates, chlorocobaltates, fluorozincates, chlorozincates, borates, fluoroborates, fluoroaluminates, chloroaluminates, carbonates, silicates, fluorosilicates, fluorostannates, nitrates, nitrites, azides, cyanamides, phosphates, phosphites, phosphonates, phosphinites, thiophosphates, thiophosphites, thiophosphonates, thiophosphinites, fluorophosphates, fluoroantimonates, chloroantimonates, sulfates, sulfites, sulfonates, thiosulfates, dithionites, dithionates, fluorosulfates, tellurates, fluorides, chlorides, chlorates, perchlorates, bromides, bromates, iodides, iodates, periodates, heteropolyanions, ferricyanides, ferrocyanides, cyanocobaltates, cyanocuprates, cyanomanganates, cyanates, cyanatoferrates, cyanatocobaltates, cyanatocuprates, cyanatomanganates, thiocyanates, thiocyanatoferrates, thiocyanatocobaltates, thiocyanatocuprates, thiocyanatomanganates, cyanamides, cyanamidoferrates, cyanamidocobaltates, cyanamidocuprates, cyanamidomanganates, nitritoferrates, nitritocobaltates, azides, (thio)carboxylates, di(thio)carboxylates, tri(thio)carboxylates, tetra(thio)carboxylates, (thio)phenolates, di(thio)phenolates, tri(thio)phenolates, tetra(thio)phenolates, (thio)phosphonates, di(thio)phosphonates, tri(thio)phosphonates, (thio)phosphonamides, di(thio)phosphonamides, tri(thio)phosphonamides,

amino(thio)phosphonates, diamino(thio)phosphonates, triamino(thio)phosphonates, imino(thio)phosphonates, diimino(thio)phosphonates, (thio)sulfonates, di(thio)sulfonates, tri(thio)sulfonates, (thio)sulfonamides, di(thio)sulfonamides, tri(thio)sulfonamides, amino(thio)sulfonates, diamino(thio)sulfonates, triamino(thio)sulfonates, imino(thio)sulfonates, diimino(thio)sulfonates, (thio)borates, di(thio)borates, (thio)boronates, organic silicates, stibonates, or combinations thereof.

91. (Original) The method of claim 83 wherein the rare earth/valence stabilizer complex is adsorbed onto, into, or mixed with an inert medium selected from oxides, hydroxides, phosphates, borates, silicates, carbonates, aluminates, titanates, molybdates, tungstates, oxalates, polymers, or combinations thereof.

92. (Original) The method of claim 77 wherein the pigment is colored.

93. (Original) The method of claim 77 wherein the pigment exhibits a color change between trivalent and tetravalent oxidation states.

94. (Original) The method of claim 77 wherein the pigment is light-fast.

95. (Original) The method of claim 77 wherein the substrate is selected from metals, semimetals, semiconductors, composite materials with anisotropic electrical conductivity, or materials in a conductive or dielectric medium.

96. (Original) The method of claim 77 further comprising treating the surface of the substrate before applying the pigment.

97. (Original) The method of claim 77 further comprising applying a coating to the substrate before applying the pigment.

98. (Original) The method of claim 77 further comprising applying a coating concurrently with applying the pigment.

99. (Original) The method of claim 77 further comprising applying a coating to the substrate, the coating selected from organic coatings, inorganic coatings, or combinations thereof.

100. (Original) The method of claim 99 wherein the coating is the organic coating selected from alkyd-type primers, acrylic primers, oil-based primers, polyester primers, polyurethane primers, polyimide primers, polyamide primers, epoxy primers, conductive primers, organic sol-gels, ketimine coatings, polyvinyl coatings, acrylic thermoplastics, asphaltic and coal tar thermoplastics, polyamide thermoplastics, polyethylene dispersion thermoplastics, fluorocarbon thermoplastics, chlorocarbon thermoplastics, silicone thermosets, polyurethane thermosets, polyester thermosets, epoxy-amine thermosets, epoxy-amide thermosets, epoxy-ester thermosets, epoxy-coal tar thermosets, furane thermosets, phenolic thermosets, butadiene styrene elastomers, chlorinated rubber elastomers, polysulfonated elastomers, neoprene elastomers, or combinations thereof.

101. (Original) The method of claim 99 wherein the coating is the inorganic coating selected from low temperature enamels, low temperature glass frits, carbonaceous coatings, zeolites, inorganic sol-gels, or combinations thereof.

102. (Currently Amended) A corrosion-inhibiting pigment composition comprising:

a corrosion-inhibiting pigment comprising a rare earth element and a valence stabilizer combined to form a rare earth/valence stabilizer complex, wherein the rare earth element is

selected from cerium, terbium, praseodymium, or a combination thereof, at least one rare earth element is in the tetravalent oxidation state, and the rare earth/valence stabilizer complex is sparingly soluble in water at about 25°C and about 760 Torr; and

a coating system selected from a carrier system, a binder system, or a resin system.

103. (Currently Amended) A method of making a corrosion-inhibiting pigment composition comprising:

providing a solvent;

providing a rare earth source in the solvent forming a rare earth solution, wherein the rare earth source is selected from a cerium source, a terbium source, a praseodymium source, or a combination thereof, and at least one rare earth source is in the tetravalent oxidation state;

providing a valence stabilizer; and

combining the rare earth source and the valence stabilizer to form a rare earth/valence stabilizer complex; and

combining the rare/earth/valence stabilizer complex with a coating system selected from a carrier system, a binder system, or a resin system, wherein the rare earth/valence stabilizer complex is sparingly soluble in water at about 25°C and about 760 Torr.

104. (Currently Amended) A method for treating a surface for corrosion resistance, comprising:

providing a substrate to be coated; and

applying a corrosion-inhibiting pigment composition comprising a corrosion-inhibiting pigment comprising a rare earth source and a valence stabilizer combined to form a rare earth/valence stabilizer complex, wherein the rare earth source is selected from a cerium source, a terbium source, a praseodymium source, or a combination thereof, at least one rare earth source

is in the tetravalent oxidation state, and the rare earth/valence stabilizer complex is sparingly soluble in water at about 25°C and about 760 Torr; and

a coating system selected from a carrier system, a binder system, or a resin system.